

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 12/07/2021 – updated 02/01/2022 for IWC

TO: Laura Dietrich – SER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for the Kewaskum Village
WPDES Permit No. WI-0021733-10 FIN: 5934

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Village of Kewaskum in Washington County. This municipal wastewater treatment facility (WWTF) discharges to the Milwaukee River, located in the Upper Milwaukee River Watershed in the Milwaukee River Basin. This discharge is included in the Milwaukee River TMDL as approved by EPA in March 2018. The evaluation of the permit recommendations is discussed in more detail in the attached report.

The following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD ₅ May – October			10 mg/L 63 lbs/day	10 mg/L	1
November – April			18 mg/L 113 lbs/day	18 mg/L	
TSS					3
Dissolved Oxygen		6.0 mg/L			1
pH	9.0 s.u.	6.0 s.u.			1
Bacteria					4
<i>E. coli</i>				126 #/100 mL geometric mean	
Ammonia Nitrogen					5
April	24 mg/L		8.8 mg/L	7.1 mg/L	
May – October			6.4 mg/L	6.4 mg/L	
November – March	24 mg/L		14.3 mg/L	11.5 mg/L	
Phosphorus					3,6
LCA Interim Limit				0.86 mg/L	
HAC Interim Limit				0.80 mg/L	
Final				TMDL	
Chloride					7
TKN, Nitrate+Nitrite, and Total Nitrogen					8
Chronic WET				1.4 TUc	9,10
Acute WET					9,10
Temperature					1,2

Footnotes:

1. No changes from the current permit.

2. Monitoring only.
3. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Milwaukee River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in March 2018.

Month	Monthly Average TP Effluent Limit (lbs/day)	Weekly Ave TSS Effluent Limit (lbs/day)	Weekly Ave TSS Effluent Limit (mg/L)	Monthly Ave TSS Effluent Limit (mg/L)
Jan	1.81	108	18	12
Feb	2.03	88.4	18	12
Mar	1.98	77.4	18	12
Apr	0.70	113	12	12
May	2.45	63	10	10
Jun	1.85	63	10	10
Jul	1.42	63	10	10
Aug	1.26	63	10	10
Sep	1.89	63	10	10
Oct	1.36	63	10	10
Nov	1.85	113	18	12
Dec	1.72	113	18	12

4. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. Under the phosphorus MDV, a level currently achievable (LCA) interim limit of 0.86 mg/L should be effective upon permit reissuance. A compliance schedule may be included in the permit until the highest attainable condition (HAC) limit of 0.80 mg/L can be met. The final phosphorus limits are the TMDL-based mass limits.
7. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
8. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).
9. Acute WET testing is recommended 2/permit term and chronic WET testing is recommended 1x yearly. The Instream Waste Concentration (IWC) to assess chronic test results is 72%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the Milwaukee River.
10. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at Nicole.Krueger@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, Map, & Thermal Table

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Attachment #1
**Water Quality-Based Effluent Limitations for
Kewaskum Village**

WPDES Permit No. WI-0021733-10

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Kewaskum operates a 0.75 MGD average annual design flow, activated sludge plant originally built in 1955. The plant was upgraded in 1971 and a major upgrade was completed again in 2009. The plant serves an approximate population of 4000 people. All wastewater flow is pumped to the plant. The treatment process includes fine screening, grit removal, two primary clarifiers, three aeration tanks (in series), three final clarifiers, and ultraviolet disinfection. The final effluent passes through a re-aeration manhole before being discharged to the Milwaukee River. Ferrous chloride is added prior to the primary clarifiers to aid in phosphorus removal and can also be added before the final clarifiers if needed. Biosolids are aerobically digested in three tanks and stored onsite in a 1.1-million-gallon tank before being hauled offsite and land applied by a licensed contract hauler onto Department approved agricultural fields.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, expiring on 03/31/2022, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅ May – October November – April			10 mg/L 63 lbs/day 18 mg/L 113 lbs/day	10 mg/L 18 mg/L		
TSS May – October November – April			10 mg/L 63 lbs/day 18 mg/L 113 lbs/day	10 mg/L 18 mg/L		
Dissolved Oxygen		6.0 mg/L				2
pH	9.0 s.u.	6.0 s.u.				2
Fecal Coliform May – September			656#/100 mL geometric mean	400#/100 mL geometric mean		
Ammonia Nitrogen April May – October	24 mg/L		8.8 mg/L 6.4 mg/L	7.1 mg/L 8.1 mg/L		

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
November – March	24 mg/L		14.3 mg/L	11.5 mg/L		
Phosphorus Interim Final				0.86 mg/L 0.225 mg/L	0.075 mg/L 0.47 lbs/day	3
Chloride						1
Chronic WET				1.4 TUc		4
Acute WET						4
Temperature						1

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. A compliance schedule is in the current permit to meet the final WQBEL by April 1, 2026.
4. Acute WET testing is required 2/permit term and chronic WET testing is required annually.

Receiving Water Information

- Name: Milwaukee River
- Waterbody Identification Code (WBIC): 15000
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply. (Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.)
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station #04086150, where Outfall 001 is located. The low flows were updated by USGS on 11/05/2021.

7-Q₁₀ = 7.4 cfs (cubic feet per second)

7-Q₂ = 11 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q ₁₀ (cfs)	12	12	19	32	17	12	8.8	9.0	8.2	10	15	14
7-Q ₂ (cfs)	22	23	42	49	34	23	16	14	14	18	24	24

The previous WQBEL memo used low flows of: 7-Q₁₀ = 1.8 cfs and 7-Q₂ = 9.0 cfs.

- Hardness = 346 mg/L as CaCO₃. This value represents the geometric mean of data from WET testing from 08/04/2015 to 06/05/2018.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from the Milwaukee River at Batavia is used for this evaluation. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: There are several other dischargers to the Milwaukee River however they are

not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.

- Impaired water status: The immediate receiving water is 303(d) listed as impaired for PCBs and total phosphorus.

Effluent Information

- Design flow rate(s):
Annual average = 0.75 MGD (Million Gallons per Day)
For reference, the actual average flow from 04/01/2017 to 10/31/2021 was 0.50 MGD.
- Hardness = 448 mg/L as CaCO₃. This value represents the geometric mean of data from 09/14/2021 to 09/23/2021.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic wastewater with water supply from wells
- Additives: Ferric chloride
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

	Copper µg/L
09/14/2021	6
09/17/2021	6
09/20/2021	6
09/23/2021	7
Average	6.25

	Chloride (mg/L)
1-day P ₉₉	698
4-day P ₉₉	593
30-day P ₉₉	533
Mean	500
Std	74.2
Sample Size	238
Range	195 – 740
Dates	04/01/2017 – 10/15/2021

The following table presents the average concentrations and loadings at Outfall 001 from for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD ₅	4.2 mg/L*	18 lbs/day
TSS	5.3 mg/L*	23 lbs/day
pH field	7.1 s.u.	
Phosphorus	0.46 mg/L	1.84 lbs/day
Ammonia Nitrogen	0.03 mg/L*	
Dissolved oxygen	9.95 mg/L	
Fecal coliform	29.4 #/100 mL	

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Adm. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)

if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

Q_e = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

C_s = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

Attachment #1

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Kewaskum and the limits are set based on two times the acute toxicity criteria.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 5.92 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		340		680	136	<20		
Cadmium	448	57.6	0.02	115	23.0	1		
Chromium	301	4446	0.50	8892	1778	<3		
Copper	448	63.9	1.26	128	25.5	6.25		
Lead	356	365	0.65	729	146	<20		
Nickel	268	1080		2161	432	20		
Zinc	333	345	2.61	689	138	20		
Chloride (mg/L)		757		1514			698	740

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

** The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q₁₀ flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 1.85 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		152		395	79.0	<20	
Cadmium	175	3.82	0.02	9.88	2.0	1	
Chromium	301	326	0.50	844	169	<3	
Copper	346	29.9	1.26	75.7	15.1	6.25	
Lead	346	92.9	0.65	240	48.0	<20	
Nickel	268	120		312	62.4	20	
Zinc	333	345	2.61	890	178	20	
Chloride (mg/L)		395		1025			593

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 8.02 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.02	2927	585.5	1
Chromium (+3)	3818000	0.50	30207699	6041540	<3
Lead	140	0.65	1103	221	<20
Nickel	43000		340212	68042	20

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 8.02 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	105	21.1	<20

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not required for toxic substances in this section.

Chloride – Considering available effluent data from the current permit term (04/01/2017 to 10/15/2021), the 1-day P₉₉ chloride concentration is 698 mg/L, and the 4-day P₉₉ of effluent data is 593 mg/L.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

Mercury – The permit application did not require monitoring for mercury because the Kewaskum is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from 08/17/2016 to 04/03/2020 was 0.27 mg/kg, with a maximum reported concentration of 0.73 mg/kg. Therefore, no mercury monitoring is recommended at Outfall 001.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BOD, TSS AND AMMONIA NITROGEN

The weekly and monthly average BOD, TSS and ammonia nitrogen limits could potentially increase with the increase in the receiving water low flows. However, to allow an increase in a limit above an existing limit the facility must demonstrate the need for the higher limits consistent with s. NR 207.04(1), Wis. Adm. Code.

If Kewaskum would like to request an increase to the existing permit limits for BOD₅, TSS, or ammonia nitrogen an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. If the facility can successfully demonstrate the need for increased effluent limitations required in ch. NR 207, Wis. Adm. Code, then a recalculation of the specific effluent limitation will be provided.

An initial review suggests that the requirements of s. NR 207.04(1)(a), Wis. Adm. Code, do not appear to be met based on BOD₅, TSS, and Ammonia Nitrogen effluent concentrations based on data from 04/01/2017 to 10/31/2021. **Therefore, the current weekly and monthly average limits for BOD, TSS and Ammonia Nitrogen are required to be retained in the reissued permit consistent with s. NR 207.04(2), Wis. Adm. Code.**

See the Expression of Limits section of this memo for additional requirements for ammonia limits.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 05/21/2017 to 10/28/2021, for informational purposes.

Ammonia Nitrogen mg/L	April	May – October	November – March
1-day P ₉₉	0.10	0.60	0.50
4-day P ₉₉	0.10	0.40	0.30
30-day P ₉₉	0.03	0.16	0.14
Mean*	0.02	0.04	0.04
Std	0.02	0.22	0.19
Sample size	31	185	214
Range	<0.02 – 0.07	<0.02 – 2.14	<0.02 – 1.81

*Values lower than the level of detection were substituted with a zero

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.

2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because Kewaskum's permit requires weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May through September. No changes are recommended to the current recreational period and the required disinfection season.

Effluent Data

Kewaskum has monitored effluent *E. coli* from 06/22/2021 to 09/27/2021 and a total of 12 results are available using the Colilert method. A geometric mean of 126 counts/100 mL was exceeded in 0 times with a maximum monthly geometric mean of 14 counts/100 mL. Effluent data has exceeded 410 counts/100 mL 0 times. The maximum reported value was 22 counts/100 mL. Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Kewaskum currently has a limit of 0.86 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

In addition, the need for a WQBEL for phosphorus must be considered.

Total Maximum Daily Load

The Milwaukee River Total Maximum Daily Load (TMDL) report addresses phosphorus water quality impairments within the Milwaukee River Basin and provides waste load allocations (WLAs) required to meet water quality standards. Effluent limitations based on these WLAs must be included in WPDES permits according to s. NR 217.16, Wis. Adm. Code. The TMDL-derived phosphorus limits may be included in lieu of or in addition to the calculated limits upon permit reissuance or modification if certain conditions are met and the s. NR 217.13, Wis. Adm. Code WQBEL has not yet taken effect.

Because the Milwaukee River Basin TMDL was developed to protect and improve the water quality of all streams and rivers within the basin, and the s. NR 217.13, Wis. Adm. Code, and the WQBEL has not taken effect for Kewaskum, the TMDL-based limits can be included in the WPDES permit in place of the s. NR 217.13, Wis. Adm. Code, WQBEL. The TMDL-based limits should be expressed in a manner consistent with the wasteload allocation and assumptions of the TMDL.

The monthly average total phosphorus (TP) effluent limits in lbs/day are calculated based on the maximum monthly phosphorus WLA given in pounds per month as suggested in the TMDL report and

implementation guidance. The monthly maximum TP WLAs for this facility are found in Appendix A of the Milwaukee River Basin TMDL report. **The monthly average limits shown in the table below are recommended in place of the s. NR 217.13, Wis. Adm. Code, limit, and should be expressed in pounds per day.** For informational purposes, the TMDL mass limits in the following table are equivalent to monthly average concentrations ranging 0.11 mg/L to 0.39 mg/L at the annual average design flow of 0.75 MGD.

Total Phosphorus Wasteload Allocations and Effluent Limits

Month	Monthly Maximum TP WLA ¹ (lbs/month)	Days Per Month	Monthly Average TP Effluent Limit ² (lbs/day)
Jan	56.00	31	1.81
Feb	56.90	28	2.03
Mar	61.43	31	1.98
Apr	20.88	30	0.70
May	76.02	31	2.45
Jun	55.45	30	1.85
Jul	44.12	31	1.42
Aug	39.03	31	1.26
Sep	56.68	30	1.89
Oct	42.05	31	1.36
Nov	55.54	30	1.85
Dec	53.44	31	1.72

Footnotes:

1- Milwaukee River Basin TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.17 for the Milwaukee River Watershed

2- Monthly Average Total P effluent limit (lbs/day) = monthly Total P WLA (lbs/month) ÷ days per month

Because these WLAs must be included in the reissued permit, no reasonable potential determination is needed.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 04/05/2015 to 10/27/2021.

Total Phosphorus Effluent Data

	Phosphorus mg/L	Phosphorus lbs/day
1-day P ₉₉	1.3	6.6
4-day P ₉₉	0.80	3.9
30-day P ₉₉	0.56	2.5
Mean	0.45	1.8
Std	0.25	1.3
Sample size	995	664
Range	0.01 - 3.65	0 – 18

Multi-Discharge Variance Interim Limit

With the permit application, Kewaskum has applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL for this permit term. The recommended interim limit, pursuant to s. 283.16 (6) 1, Wis. Stats., is 0.8 mg/L as a monthly average. A compliance schedule may be appropriate to meet this interim limit, but compliance with 0.8 mg/L shall be no later than the end of the reissued permit.

The current interim limit of **0.86 mg/L is a level currently achievable (LCA)** for the discharge. A limit of 0.86 mg/L as a monthly average should not be exceeded during the compliance schedule.

PART 6 – TOTAL SUSPENDED SOLIDS

The TMDL also has wasteload allocations (WLAs) for total suspended solids (TSS). For a municipal facility, the limits for TSS must be expressed as weekly and monthly averages. The current permit includes weekly and monthly average concentration limits of 10 mg/L for May – October and weekly and monthly average limits of 18 mg/L. Current TSS mass limits are 63 lbs/day as a weekly average for May – October and 113 lbs/day as a weekly average for November – April.

Monthly average and weekly average mass effluent limitations derived from the TMDL WLAs should be included in the permit according to the table below, along with the currently imposed concentration limits. Consistent with Section 6.4.1 of the Milwaukee River Basin TMDL Report, in cases where the equivalent TSS concentration limit is ≤ 12 mg/L, the effluent limit will be expressed as a monthly average concentration of 12 mg/L.

Total Suspended Solids Wasteload Allocations

Month	Monthly TSS WLA ¹ (lbs/month)	Days Per Month	Monthly Ave TSS Effluent Limit ² (lbs/day)	Equivalent Conc. Limit ³ at 0.75 MGD (mg/L)	Weekly Ave TSS Effluent Limit ⁴ (lbs/day)	Equivalent Conc. Limit ³ at 0.75 MGD (mg/L)
Jan	1,620.16	31	52.3	8.36	108	17.3
Feb	1,195.82	28	42.7	6.83	88.4	14.1
Mar	1,159.69	31	37.4	5.98	77.4	12.4
Apr	444.51	30	14.8	2.37	30.7	4.9
May	934.14	31	30.1	4.82	62.4	10.0
Jun	721.31	30	24.0	3.84	49.8	8.0
Jul	641.38	31	20.7	3.31	42.8	6.8
Aug	391.50	31	12.6	2.02	26.1	4.2
Sep	783.59	30	26.1	4.18	54.1	8.6
Oct	872.03	31	28.1	4.50	58.2	9.3
Nov	1,679.28	30	56.0	8.95	116	18.5
Dec	1,749.10	31	56.4	9.02	117	18.7

Footnotes:

1- Milwaukee River Basin TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.19 for the Milwaukee River Watershed

2- Monthly average TSS effluent limit (lbs/day) = maximum monthly TSS WLA (lbs/month) ÷ days per month

3- Equivalent Concentration = mass / (annual average design flow * 8.34)

4- Weekly average effluent limit (lbs/day) = monthly average limit (lbs/day) x multiplier

The multiplier used in the weekly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 0.8. This is

the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 3/week; if a different monitoring frequency is used, the stated limits should be reevaluated.

Monthly average limits: Because **all of the monthly average TSS effluent limits equate to concentration limits of less than 12 mg/L**, mass-based limits for TSS are not needed for permit reissuance, and a concentration limit of 12 mg/L is recommended. Because the existing concentration limit of 10 mg/L as a monthly average is more restrictive than 12 mg/L for May – October, the Department would be unable to increase the permit limits for TSS because the requirements in ch. NR 207, Wis. Adm. Code, are not met. **It is recommended that the monthly average limits for November – April of 12 mg/L and the monthly average limits for May – October of 10 mg/L be included in the reissued permit.**

Weekly average limits: Because the weekly average TSS effluent limits equate to concentration limits of less than 12 mg/L for the months of April – October, mass-based limits for TSS are not needed for permit reissuance, and a concentration limit of 12 mg/L is recommended. Because the existing concentration limit of 10 mg/L as a monthly average is more restrictive than 12 mg/L for May – October, the Department would be unable to increase the permit limits for TSS because the requirements in ch. NR 207, Wis. Adm. Code, are not met. **It is recommended that the weekly average limit for April of 12 mg/L and the weekly average limits for May – October of 10 mg/L be included in the reissued permit. The current weekly average mass limits for April – October are recommended to continue in the reissued permit.**

For the months of **January – March, the TMDL-based mass limits and current concentration limits are recommended.** The weekly average mass limit for November and December is 113 lbs/day which is more restrictive than the calculated TMDL-based mass limits for these months. Therefore, **the current weekly average mass limits and concentration limits are recommended to continue in the reissued permit for November and December.**

Below is the summary table of limits recommended for TSS:

Month	Weekly Ave TSS Effluent Limit (lbs/day)	Weekly Ave TSS Effluent Limit (mg/L)	Monthly Ave TSS Effluent Limit (mg/L)
Jan	108	18	12
Feb	88.4	18	12
Mar	77.4	18	12
Apr	113	12	12
May	63	10	10
Jun	63	10	10
Jul	63	10	10
Aug	63	10	10
Sep	63	10	10
Oct	63	10	10
Nov	113	18	12
Dec	113	18	12

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Limits based on a WLA should be given in a permit regardless of reasonable potential. The following table lists the statistics for effluent TSS as both a concentration and a mass, from 04/02/2017 to 10/27/2021. A compliance schedule may be included in the permit to meet these effluent limits, if warranted.

	TSS (mg/L)	TSS (lbs/day)
1-day P ₉₉	15.4	98.1
4-day P ₉₉	9.60	55.1
30-day P ₉₉	6.67	32.8
Mean	5.31	23.2
Std	2.91	19.7
Sample Size	690	686
Range	<2 – 25.4	0 – 306

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from 04/01/2015 to 10/31/2021.

The table below summarizes the maximum temperatures reported during monitoring from 08/01/2014 to 10/31/2021.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	48	49	78	120
FEB	48	49	75	113
MAR	48	49	59	92
APR	51	53	64	106
MAY	59	60	74	104
JUN	63	64	91	95

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Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JUL	67	69	105	102
AUG	72	73	95	93
SEP	69	70	90	98
OCT	68	69	70	96
NOV	62	63	63	120
DEC	52	53	73	120

Reasonable Potential

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
 - (a) The highest recorded representative daily maximum effluent temperature
 - (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub-lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
 - (a) The highest weekly average effluent temperature for the month.
 - (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Based on the available effluent data no effluent limits are recommended for temperature. The complete thermal table used for the limit calculation is in Attachment #3. **Temperature monitoring for one year is recommended in the reissued permit.**

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (October 29, 2019)*.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests

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must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **39%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$\text{IWC (as \%)} = Q_e \div \{(1 - f) Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 0.75 MGD = 1.16 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = 1/4 of the 7-Q₁₀ = 7.4 cfs ÷ 4 = 1.85 cfs

*The IWC decreased because the updated receiving water low flows have increased since the last WQBEL memo.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. There was a major facility upgrade in 2009, so data prior to this is not representative of current treatment conditions so are not included in this evaluation.

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
11/02/2010					>100	>100	Pass	No	1
02/22/2011					>100	>100	Pass	No	1
05/02/2011	>100	>100	Pass	Yes					
07/21/2011					>100	>100	Pass	Yes	
09/08/2011					>100	>100	Pass	Yes	
11/08/2011					>100	>100	Pass	Yes	
01/17/2012					>100	>100	Pass	Yes	
04/10/2012					>100	>100	Pass	Yes	

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07/10/2012	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
11/06/2012					36.8	>100	Fail	Yes	
12/06/2012					>100	>100	Pass	Yes	
01/10/2013					90.3	>100	Pass	Yes	
02/19/2013					>100	>100	Pass	Yes	
05/07/2013					>100	>100	Pass	Yes	
09/05/2013					85	>100	Pass	Yes	
12/03/2013					>100	>100	Pass	Yes	
01/21/2014					>100	>100	Pass	Yes	
05/06/2014					>100	>100	Pass	Yes	
07/15/2014					>100	>100	Pass	Yes	
10/09/2014					>100	>100	Pass	Yes	
01/20/2015					>100	>100	Pass	Yes	
05/05/2015					>100	>100	Pass	Yes	
08/04/2015					>100	>100	Pass	Yes	
11/03/2015					>100	>100	Pass	Yes	
11/14/2017					>100	>100	Pass	Yes	
06/05/2018	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
03/19/2019					>100	>100	Pass	Yes	
08/04/2020					>100	>100	Pass	Yes	
10/26/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Footnotes:

1. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis
- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

$$\text{Acute Reasonable Potential} = [(TU_a \text{ effluent}) (B)(AMZ)]$$

$$\text{Chronic Reasonable Potential} = [(TU_c \text{ effluent}) (B)(IWC)]$$

According to s. NR 106.08(6)(d), Wis. Adm. Code, TU_a and TU_c effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50} , IC_{25} or $IC_{50} \geq 100\%$).

Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.
Chronic Reasonable Potential = $[(TU_c \text{ effluent}) (B)(IWC)]$

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Chronic WET Limit Parameters

TU_c (maximum) 100/IC ₂₅	B (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/36.8 = 2.7	3.0 Based on 3 detects	39%

$$[(TU_c \text{ effluent}) (B)(IWC)] = 3.18 > 1.0$$

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6) and representative data from 07/21/2011 to 03/19/2019.

Expression of WET limits

Chronic WET limit = $[100/IWC] TU_c = 2.6 TU_c$ expressed as a monthly average

This limit is greater than the current limit of 1.4 TU_c . If Kewaskum would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limit of 1.4 TU_c and the current IWC of 72% must be continued in the reissued permit. The Department would be unable to increase the limit due to the lack of need as shown via the antidegradation rule (ch. NR 207, Wis. Adm. Code).

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: <https://dnr.wisconsin.gov/topic/Wastewater/WET.html>.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. 0 Points	IWC = 72%. 15 Points
Historical Data	3 tests used to calculate RP. No tests failed. 0 Points	26 tests used to calculate RP. 1 test failed. 0 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	Warmwater sport fish classification 5 Points	Same as Acute. 5 Points

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	Acute	Chronic
Chemical-Specific Data	Reasonable potential for limits for no substances based on ATC; Ammonia nitrogen limit carried over from the current permit. Ammonia, arsenic, cadmium, lead, nickel, zinc, and chloride detected. Additional Compounds of Concern: None 3 Points	Reasonable potential limits for no substances based on CTC; Ammonia nitrogen limit carried over from the current permit. Ammonia, arsenic, cadmium, lead, nickel, zinc, and chloride detected. Additional Compounds of Concern: None 3 Points
Additives	0 Biocides and 1 Water Quality Conditioners (ferrous chloride) added. P treatment chemical other than Ferric Chloride (FeCl), Ferrous Sulfate (FeSO ₄), or alum used: No 1 Point	All additives used more than once per 4 days. 1 Point
Discharge Category	2 Industrial Contributors: Family Dairies and Kewaskum Foods LLC 6 Points	Same as Acute. 6 Points
Wastewater Treatment	Secondary or Better 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known 0 Points	Same as Acute. 0 Points
Total Checklist Points:	15 Points	30 Points
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term (year 2, 4, 6, etc.)	1x yearly
Limit Required?	No	Yes Limit = 1.4 TU _c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2019) and other information described above 2/permit term acute and 1x yearly chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 1.4 TU_c as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

PART 9 – EXPRESSION OF LIMITS

Revisions to chs. NR 106 and 205, Wis. Adm. Code, align Wisconsin's WQBELs with 40 CFR 122.45(d), which requires WPDES permits contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Kewaskum is a municipal treatment facility and is therefore subject to weekly average and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with these rules or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, pH, and *E. coli* among other parameters. Mass limitations are not subject to the limit expression requirements if concentrations limits are given.

Method for Calculation

The methods for calculating limitations for continuous discharges subject to ch. NR 210 to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), Wis. Adm. Code, and are as follows:

1. Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.
 - The current monthly average limit for May – October is 8.1 mg/L which is less restrictive than the current weekly average limit of 6.4 mg/L. Therefore, the monthly average limit is recommended to be set equal to the weekly average limit.
3. Whenever a monthly average limitation is determined necessary to protect water quality, a weekly average limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

$$\text{Weekly Average Limitation} = (\text{Monthly Average Limitation} \times \text{MF})$$

Where:

MF= Multiplication factor as defined in Table 1

CV= coefficient of variation (CV) as calculated in s. NR 106.07(5m), Wis. Adm. Code.

n= the number of samples per month required in the permit

s. NR 106.07(3)(e)4, Table 1, Wis. Adm. Code — Multiplication Factor (for CV = 0.6)

CV	n=1	n=2	n=3	n=4	n=8	n=12	n=16	n=20	n=24	n=30
0.6	1.00	1.31	1.51	1.64	1.95	2.12	2.23	2.30	2.36	2.43

Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.

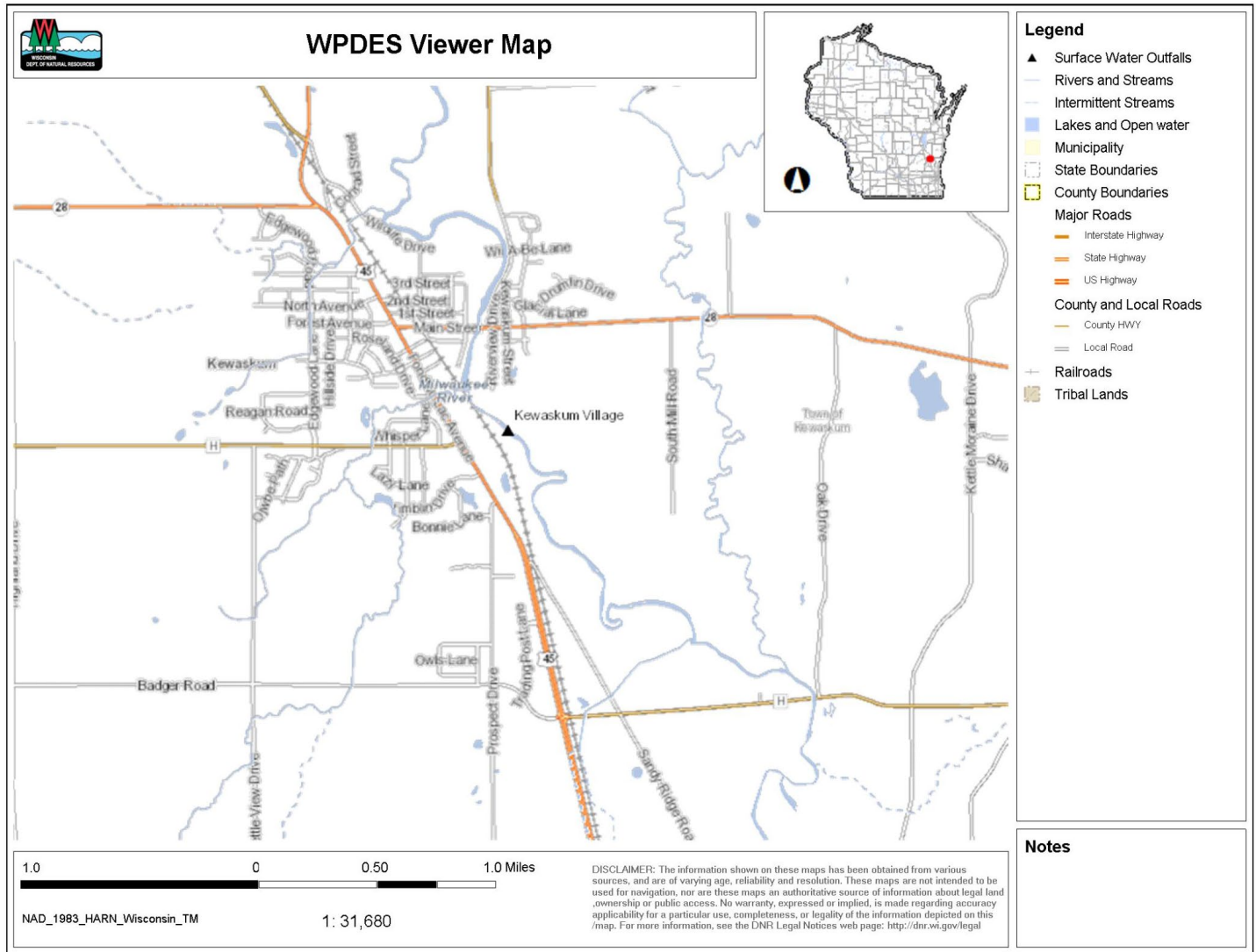
Summary of Additional Limitations:

In conclusion, the following additional limitations are required to comply with ss. NR 106.07 and NR

205.065(7), Wis. Adm. Code.

Expression of Limits Summary

Parameter	Daily Maximum	Weekly Average	Monthly Average
Ammonia Nitrogen May – October		6.4 mg/L	6.4 mg/L



Attachment # 3

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Kewaskum	7-Q₁₀:	7.40 cfs	Temp Dates		Flow Dates	
Outfall(s):	001	Dilution:	25%	Start:	08/01/14	End:	04/01/15
Date Prepared:	11/19/2021	f:	0	End:	10/31/21		10/31/21
Design Flow (Q_e):	0.75 MGD	Stream type:	Small warm water sport or forage fish co				
Storm Sewer Dist.	0 ft	Qs:Q_e ratio:	1.6 :1				
Calculation Needed?		YES					

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	7.40	0.669	0.987	0	48	49	78	120
FEB	34	50	76	7.40	0.763	1.347	0	48	49	75	113
MAR	38	52	77	7.40	2.497	3.082	0	48	49	59	92
APR	48	55	79	7.40	0.944	1.352	0	51	53	64	106
MAY	58	65	82	7.40	0.904	1.289	0	59	60	74	104
JUN	66	76	84	7.40	0.806	1.969	0	63	64	91	95
JUL	69	81	85	7.40	0.601	1.108	0	67	69	105	102
AUG	67	81	84	7.40	1.221	2.270	0	72	73	95	93
SEP	60	73	82	7.40	0.938	1.689	0	69	70	90	98
OCT	50	61	80	7.40	1.434	2.243	0	68	69	70	96
NOV	40	49	77	7.40	0.744	0.910	0	62	63	63	120
DEC	35	49	76	7.40	0.704	0.903	0	52	53	73	120